

WHAT IS CLAIMED IS:

1. A hybrid illumination system that provides illumination for a platen in a print scanner, comprising:

an illumination source array that emits light from a plurality of discrete light sources;

at least one diffuser; and

a collimating lens, each diffuser being disposed between said illumination source array and said collimating lens such that at least a portion of the light emitted from said plurality of discrete light sources passes through each diffuser to said collimating lens as diffuse light, and

wherein at least a first portion of light that exits said collimating lens falls on the platen as collimated light, and at least a second portion of light that exits said collimating lens falls on the platen as diffuse light.

2. The hybrid illumination system of claim 1, wherein said at least one diffuser comprises one holographic diffuser.

3. The hybrid illumination system of claim 1, wherein said at least one diffuser comprises two holographic diffusers.

4. The hybrid illumination system of claim 1, wherein said at least one diffuser comprises one holographic diffuser and one glass diffuser.

5. The hybrid illumination system of claim 1, wherein said at least one diffuser includes at least one diffuser selected from the following group: a holographic diffuser, a plastic diffuser, and a glass diffuser.

6. The hybrid illumination system of claim 1, wherein said at least one diffuser comprises one diffuser positioned near said collimating lens.

7. The hybrid illumination system of claim 1, wherein said at least one diffuser comprises a first diffuser positioned near said illumination source array and a second diffuser positioned near said collimating lens.

8. The hybrid illumination system of claim 7, further comprising a mirror positioned between said first diffuser and said second diffuser.

9. The hybrid illumination system of claim 1, further comprising a prism, wherein said prism is provided between said collimating lens and the platen.

10. The hybrid illumination system of claim 9, wherein the platen comprises a surface of said prism or a surface of an optical element provided in optical contact with a surface of said prism.

11. The hybrid illumination system of claim 1, wherein said illumination source array comprises a plurality of sources that emit blue/green light.

12. The hybrid illumination system of claim 11, wherein said blue/green light is equal to or approximately equal to 510 nm.

13. The hybrid illumination system of claim 1, wherein the print scanner comprises a palm print scanner and said illumination source array comprises sixty-four light emitting diodes that emit blue/green light to provide flat, uniform illumination of the platen, whereby, all or part of a palm can be placed on the platen and an image representative of a palm print can be detected.

14. The hybrid illumination system of claim 1, wherein the print scanner comprises a fingerprint scanner and said illumination source array comprises thirty light emitting diodes that emit blue/green light to provide flat, uniform

illumination of the platen, whereby, one or more fingers from one or two hands can be placed on the platen and an image representative of a corresponding fingerprint can be detected.

15. The illumination system of claim 1, wherein said plurality of sources are divided into at least a center region and a perimeter region, wherein the density of sources provided in said perimeter region is greater than in said center region.

16. The illumination system of claim 1, wherein the intensity of each source can be independently controlled relative to other sources such that a flat, uniform illumination is provided to the platen.

17. The illumination system of claim 1, wherein said plurality of sources is divided into at least three groups in at least three respective zones, whereby, the intensity of each group of sources can be independently controlled relative to other groups such that a flat, uniform illumination is provided to the platen.

18. An illumination system that provides illumination for a platen in a print scanner, comprising:

- an illumination source array that emits light from a plurality of discrete light sources; and

- a light wedge having one end surface that receives light emitted from said illumination source array and a reflective surface that reflects light out of said light wedge toward the platen; whereby, uniform illumination is provided to the platen.

19. The illumination system of claim 18, further comprising:

- a diffuser provided near said light wedge such that light passing out from said light wedge passes through said diffuser before illuminating the platen.

20. The illumination system of claim 18, wherein said reflective surface in said light wedge comprises a diffuse, reflective surface.

21. The illumination system of claim 20, wherein said diffuse, reflective surface comprises one roughened surface of the light wedge coated by a layer of reflective paint.

22. The illumination system of claim 19, wherein said diffuser comprises a holographic diffuser.

23. The illumination system of claim 18, wherein said illumination source array comprises a plurality of sources that emit blue/green light.

24. The illumination system of claim 18, wherein said plurality of sources are divided into at least a center region and a perimeter region, wherein the density of sources provided in said perimeter region is greater than in said center region.

25. The illumination system of claim 18, wherein the intensity of each source can be independently controlled relative to other sources such that a flat, uniform illumination is provided to the platen.

26. The illumination system of claim 18, wherein said plurality of sources is divided into at least three groups in at least three respective zones, whereby, the intensity of each group of sources can be independently controlled relative to other groups such that a flat, uniform illumination is provided to the platen.

27. A method for providing efficient, uniform illumination to a platen, comprising:

emitting light from a plurality of discrete sources;

randomizing at least part of the emitted light to obtain diffuse light;

collimating at least a part of the diffuse light to obtain collimated, diffuse light; and

illuminating the platen with the collimated, diffuse light such that an image of a print of a finger or palm placed on the platen can be obtained.

28. The method of claim 27, wherein said randomizing step comprises passing the emitted light through at least one diffuser.
29. The method of claim 27, wherein said randomizing step comprises passing the emitted light through a light wedge.
30. The method of claim 27, wherein said emitting step includes emitting blue/green light.
31. The method of claim 27, further comprising prior to said emitting step, arranging said plurality of discrete sources into at least a center region and a perimeter region, wherein the density of sources provided in said perimeter region is greater than in said center region.
32. The method of claim 27, further comprising independently controlling the intensity of each source relative to other sources such that a flat, uniform illumination is provided to the platen.
33. The method of claim 27, further comprising:  
arranging said plurality of discrete sources into at least three groups in at least three respective zones; and  
independently controlling the intensity of each group of sources relative to other groups of sources such that a flat, uniform illumination is provided to the platen.

34. A system for providing efficient, uniform illumination to a platen, comprising:

means for emitting light;

means for randomizing the emitted light to obtain diffuse light; and

means for collimating the diffuse light to obtain collimated, diffuse light; the platen being illuminated with the collimated, diffuse light such that an image of a print of a finger or palm placed on the platen having grey scale shading can be obtained.

35. For use in a print scanner, an illumination method for improving a range of grey scale shading, comprising:

emitting light in a blue/green spectrum from a plurality of discrete sources; and

illuminating a platen with at least part of the emitted light in the blue/green spectrum.

36. The method of claim 35, wherein the blue/green spectrum comprises a single wavelength equal to or approximately equal to 510 nm or a narrowband of wavelengths that includes a wavelength of 510 nm.

37. A method for efficiently illuminating a platen in a print scanner having a telecentric optical system, comprising:

emitting light from a plurality of discrete sources;

randomizing at least part of the emitted light to obtain diffuse light;

collimating at least a part of the diffuse light to obtain first and second portions of collimated, diffuse light; and

illuminating the platen with the first and second portions of collimated, diffuse light, wherein the first portion of collimated, diffuse light falls on the platen as collimated light and the second portion of collimated, diffuse light falls on the platen as diffuse light.